



## S2-1.1

# Smartphone-based Pupillometer with Chromatic Stimuli to Screen Neuro-ophthalmological Diseases

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Pupillometry technique has gained an increased interest over the years as it allows to objectively assess patient's consciousness and neuro-ophthalmological status by measuring pupillary light reflex (PLR). Chromatic pupillometry emerged with the discovery of intrinsically photosensitive retinal ganglion cells (ipRGCs), blue light sensitive and contributors to PLR. Automated pupillometers have been developed over the years to quantitatively measure PLR but have a reduced possibility to be a widespread screening tool as they are expensive and not portable. In this study, a smartphone-based pupillometer was developed, taking advantage of this technology accessibility, low-cost price, and portability. Chromatic stimuli were considered in this smartphone-based pupillometer to assess the contribution of ipRGCs to PLR and allow the screening of the neuro-ophthalmological diseases. In this preliminary study, six healthy individuals participated and pupillometric data was collected using the smartphone application developed, testing different protocols and background light conditions. The system presented good quality of eye images acquired and good behaviour in pupil data extraction. The acquisition protocols tested showed promising results to be used for chromatic pupillometry, although increasing the number of participants is mandatory and further research is needed. Nevertheless, this study shows the potential of the developed pupillometer to function as low cost, portable and accessible screening tool for neuro-ophthalmological diseases.